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Title: BATTERY-POWERED MOBILE PHONE HAVING ADDITIONAL FUNCTIONS

VERIFIED TRANSLATION OF PRIORITY DOCUMENT

The undersigned, of the below address, hereby certifies that he/she well knows both the English and Japanese languages, and that the attached is an accurate translation into the English language of the Certified Copy, filed for this application under 35 U.S.C. Section 119 and/or 365, of:

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## JAPAN PATENT OFFICE

This is to certify that the annexed is a true copy of the following application as filed with this Office.

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Applicant(s):	DENSO CORPORATION

December 22, 2000

Kozo OIKAWA  
Commissioner,  
Japan Patent Office

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[Title of Document] Claims

[Claim 1]

A cellular telephone operated by a cell (70), having supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising:

first determination means (300) for determining whether or not an actual cell capacity of the cell is smaller in value in comparison with a first threshold voltage corresponding to a level of the actual cell capacity, capable of operating the supplementary functions;

first function restriction means (330, 380) for restricting the supplementary functions when the actual cell capacity is determined smaller than the first threshold voltage by the first determination means;

second determination means (110, 160) for determining whether or not the actual cell capacity is smaller in value in comparison with a second threshold voltage lower than the first threshold voltage; and

second function restriction means (150) for restricting the telephone function when the actual cell capacity is determined smaller in comparison with the second threshold voltage by the second determination means.

[Claim 2]

A cellular telephone according to claim 1, further



comprising:

notification means (40c, 30) for notifying information; and

notification control means (240, 320) for controlling the notification means so as to give notification to the effect of restricting the supplementary functions when the actual cell capacity is determined smaller in comparison with the first threshold voltage by the first determination means.

[Claim 3]

A cellular telephone according to claim 2, wherein the supplementary function is a music function for outputting music, and when the music function is in operation, the notification control means (320) controls the notification means so as to give notification in warning sound to the effect of restricting the music function.

[Claim 4]

A cellular telephone according to claim 3, wherein the music function is for outputting the music from the notification means, and when the music function is in operation, the notification control means controls the notification means such that the warning sound is superimposed on the music before being sent out.

[Claim 5]

A cellular telephone according to any of claims 1 to 4, further comprising function operation determination means (310) for determining whether or not the supplementary functions are in operation, wherein the first function restriction means stop the supplementary functions when it is determined by the function operation determination means that the supplementary functions are in operation.

[Claim 6]

A cellular telephone according to claim 2, wherein the notification means is a display (30) for executing display, having function operation determination means (310) for determining whether or not the supplementary functions are in operation, and the notification control means (240) controls the display so as to give display to the effect of inhibiting the supplementary functions when it is determined by the function operation determination means that the supplementary functions are not in operation.

[Claim 7]

A cellular telephone according to claim 6, further comprising setting means (250) for setting whether or not inhibition of the supplementary functions by the first function restriction means is executed after control of the

display by the notification control means.

[Claim 8]

A cellular telephone according to claims 1 or 2, further comprising:

third determination means (340, 390) for determining whether or not the actual cell capacity is larger in value in comparison with a third threshold voltage higher than the first threshold voltage after the supplementary functions are restricted by the first function restriction means; and

derestriction means (350) for derestricting the supplementary functions when it is determined by the third determination means that the actual cell capacity is larger in value in comparison with the third threshold voltage.

[Claim 9]

A cellular telephone according to any of claims 1 to 8, wherein the first to third determination means determine the actual cell capacity on the basis of a terminal voltage of the cell.

[Claim 10]

A cellular telephone operated by a cell (70), having notification means (40c, 30) for notifying information, together with supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising:

first determination means (300) for determining whether or not an actual cell capacity of the cell is smaller in value in comparison with a first threshold voltage corresponding to a level of the actual cell capacity, capable of operating the supplementary functions;

notification control means (240, 320) for controlling the notification means so as to give notification to the effect of restricting the supplementary functions when the actual cell capacity is determined smaller in comparison with the first threshold voltage by the first determination means;

second determination means (110, 160) for determining whether or not the actual cell capacity is smaller in value in comparison with a second threshold voltage lower than the first threshold voltage; and

second function restriction means (150) for restricting the telephone function when the actual cell capacity is determined smaller in comparison with the second threshold voltage by the second determination means.

[Claim 11]

A cellular telephone operated by a cell (70), having supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising control means (330, 380) for restricting only the supplementary functions



when an actual cell capacity of the cell becomes smaller in value in comparison with a predetermined threshold voltage corresponding to a level of the actual cell capacity, capable of operating the supplementary functions.

[Claim 12]

A cellular telephone operated by a cell (70), having notification means (30, 40c) for notifying information, together with supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising notification control means (240, 320) for controlling the notification means so as to give notification, as the information, to the effect of restricting only the supplementary function when an actual cell capacity of the cell becomes smaller in value in comparison with a predetermined threshold voltage corresponding to a level of the actual cell capacity, capable of operating the supplementary functions.

[Title of Document] Specification

[Title of the Invention] CELLULAR TELEPHONE

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The invention relates to a cellular telephone.

[0002]

[Prior Art]

A process for monitoring a cell voltage of a conventional cellular telephone is described hereinafter with reference to Fig. 7. A built-in controller of the cellular telephone executes the process for monitoring the cell voltage in accordance with a flow chart shown in Fig. 7. The cellular telephone, however, has a supplementary function (for example, a function for producing "receive melody") other than a telephone function, together with the telephone function. Further, the cellular telephone has a display (liquid crystal display), which is operated by a built-in secondary cell.

[0003]

First, the process determines whether or not a call is in progress (Step 100), and proceeds to Step 110 if the call is in progress, monitoring a voltage at a positive pole terminal of the secondary cell to thereby determine

whether or not a voltage as monitored (hereinafter referred to as a monitor voltage) is a threshold voltage V11 or lower. At this point in time, the monitor voltage indicates an actual cell capacity that remains.

[0004]

Next, in Step 110, if the monitor voltage is smaller in value in comparison with the threshold voltage V11, the process causes warning to the effect of a drop in the actual cell capacity to be displayed in the display (Step 120), and proceeds to Step 130, monitoring the voltage at the positive pole terminal of the secondary cell to thereby determine whether or not the monitor voltage is a threshold voltage V00 ( $> V11$ ) larger in value than the threshold voltage V11, or higher.

[0005]

Then, in Step 130, if the monitor voltage is lower than the threshold voltage V00, the process monitors the voltage at the positive pole terminal of the secondary cell, thereby determining whether or not the monitor voltage is a threshold voltage V13 ( $< V11$ ) smaller in value than the threshold voltage V11, or lower (Step 140), and if the monitor voltage is lower than threshold voltage V13, the process proceeds to Step 150, thereby restricting the telephone function, and the supplementary function. That

is, a power source is turned OFF.

[0006]

Further, in Step 110, if the call is not in progress, the process proceeds to Step 160, and monitors the voltage at the positive pole terminal of the secondary cell, thereby determining whether or not the monitor voltage is a threshold voltage V12 ( $V11 > V12 > V13$ ) or lower, and proceeds to Step 130 if the monitor voltage is the threshold voltage V12 or lower.

[0007]

As described above, if the monitor voltage is lower than the threshold voltage V11 or the threshold voltage V12, the process causes the warning to the effect of a drop in the actual cell capacity to be displayed in the display. In addition, if the monitor voltage is the threshold voltage V13 or lower, the process restricts the telephone function, and the supplementary function thereby urging a user to charge the secondary cell, or to replace the secondary cell.

[0008]

[Problems to be Solved by the Invention]

Now, considerable increase in the number of functions has lately occurred to the cellular telephone, and numerous supplementary functions other than a primary telephone

function are being added thereto. On increasing occasions, the supplementary functions such as the function for producing the receive melody, music function, karaoke function (by delivery through connection with Internet) and so forth, among those supplementary functions, are being used by the cellular telephone as a terminal, independently, without utilizing the telephone function thereof.

[0009]

However, since the supplementary functions are operated by the same secondary cell as is used in operating the primary telephone function, if the supplementary functions are used for many hours, the actual cell capacity of the secondary cell that remains decreases, so that there has occurred a problem that not only the supplementary functions, but also even the telephone function have stopped operation unexpectedly.

[0010]

In view of the above problem, it is an object of the invention to provide a cellular telephone capable of prolonging operable time of the telephone function thereof.

[0011]

[Means for Solving the Problems]

In order to achieve the object described, in accordance with the invention as set out in claim 1, the

invention provides a cellular telephone operated by a cell (70), having supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising:

first determination means (300) for determining whether or not an actual cell capacity of the cell is smaller in value in comparison with a first threshold voltage corresponding to a level of the actual cell capacity, capable of operating the supplementary functions;

first function restriction means (330, 380) for restricting the supplementary functions when the actual cell capacity is determined smaller than the first threshold voltage by the first determination means;

second determination means (110, 160) for determining whether or not the actual cell capacity is smaller in value in comparison with a second threshold voltage lower than the first threshold voltage; and

second function restriction means (150) for restricting the telephone function when the actual cell capacity is determined smaller in comparison with the second threshold voltage by the second determination means.

[0012]

As a result, when the actual cell capacity becomes smaller than the first threshold voltage although the first threshold voltage corresponds to the level of the actual

cell capacity, capable of operating the supplementary functions, the supplementary functions are restricted, so that a drop in the actual cell capacity that remains can be deterred, thereby enabling operable time of the telephone function to be prolonged.

[0013]

In accordance with the invention as set out in claim 2, the cellular telephone may further comprise notification means (40c, 30) for notifying information, and notification control means (240, 320) for controlling the notification means so as to give notification to the effect of restricting the supplementary functions when the actual cell capacity is determined smaller in comparison with the first threshold voltage by the first determination means. As a result, it is possible to urge a user to restrict use of the supplementary functions, thereby deterring the drop in the actual cell capacity that remains.

[0014]

In accordance with the invention as set out in claim 3, the invention provides the cellular telephone wherein the supplementary function is a music function for outputting music, and when the music function is in operation, the notification control means (320) may control the notification means so as to give notification in

warning sound to the effect of restricting the music function. More specifically, in accordance with the invention as set out in claim 4, the invention provides the cellular telephone wherein the music function is for outputting the music from the notification means, and when the music function is in operation, the notification control means may control the notification means such that the warning sound is superimposed on the music before being sent out.

[0015]

In accordance with the invention as set out in claim 5, the invention provides the cellular telephone further comprising function operation determination means (310) for determining whether or not the supplementary functions are in operation, wherein the first function restriction means may stop the supplementary functions when it is determined by the function operation determination means that the supplementary functions are in operation. Further, in accordance with the invention as set out in claim 6, the invention provides the cellular telephone wherein the notification means is a display (30) for executing display, having function operation determination means (310) for determining whether or not the supplementary functions are in operation, and the notification control means (240) may



control the display so as to give display to the effect of inhibiting the supplementary function when it is determined by the function operation determination means that the supplementary functions are not in operation.

[0016]

Now, in accordance with the invention as set out in claim 7, the cellular telephone may further comprise setting means (250) for setting whether or not inhibition of the supplementary function by the first function restriction means is executed after control of the display by the notification control means, so that the music function can be actuated so as to suit preferences of the user even if there has occurred a drop in the actual cell capacity.

[0017]

In accordance with the invention as set out in claim 8, the cellular telephone may further comprise third determination means (340, 390) for determining whether or not the actual cell capacity is larger in value in comparison with a third threshold voltage higher than the first threshold voltage after the supplementary function is restricted by the first function restriction means, and derestriction means (350) for derestricting the supplementary function when it is determined by the third

determination means that the actual cell capacity is larger in value in comparison with the third threshold voltage. In accordance with the invention as set out in claim 9, the first to third determination means may determine the actual cell capacity on the basis of a terminal voltage of the cell.

[0018]

In accordance with the invention as set out in claim 10, the invention provides a cellular telephone operated by a cell (70), having notification means (40c, 30) for notifying information, together with supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising first determination means (300) for determining whether or not an actual cell capacity of the cell is smaller in value in comparison with a first threshold voltage corresponding to a level of the actual cell capacity, capable of operating the supplementary functions, notification control means (240, 320) for controlling the notification means so as to give notification to the effect of restricting the supplementary functions when the actual cell capacity is determined smaller in comparison with the first threshold voltage by the first determination means, second determination means (110, 160) for determining whether or not the actual cell

capacity is smaller in value in comparison with a second threshold voltage lower than the first threshold voltage, and second function restriction means (150) for restricting the telephone function when the actual cell capacity is determined smaller in comparison with the second threshold voltage by the second determination means.

[0019]

As a result, when the actual cell capacity becomes smaller than the first threshold voltage although the first threshold voltage corresponds to the level of the actual cell capacity, capable of operating the supplementary functions, it is possible to urge the user to restrict use of the supplementary functions, so that a drop in the actual cell capacity can be deterred, thereby enabling operable time of the telephone function to be prolonged.

[0020]

In accordance with the invention as set out in claim 11, the invention provides a cellular telephone operated by a cell (70), having supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising control means (330, 380) for restricting only the supplementary functions when an actual cell capacity of the cell becomes smaller in value in comparison with a predetermined threshold voltage corresponding to a level of

the actual cell capacity, capable of operating the supplementary functions. Thus, when the actual cell capacity becomes smaller than the predetermined threshold voltage although the predetermined threshold voltage sets to the level of the actual cell capacity, capable of operating the supplementary functions, only the supplementary functions are restricted, so that the same effect as that for the invention as set out in claim 1 can be gained.

[0021]

In accordance with the invention as set out in claim 12, the invention provides a cellular telephone operated by a cell (70), having notification means (40c, 30) for notifying information, together with supplementary functions (220, 230) other than a telephone function, said cellular telephone comprising notification control means (240, 320) for controlling the notification means so as to give notification, as the information, to the effect of restricting only the supplementary functions when an actual cell capacity of the cell becomes smaller in value in comparison with a predetermined threshold voltage corresponding to a level of the actual cell capacity, capable of operating the supplementary functions. Thus, when the actual cell capacity becomes smaller than the

predetermined threshold voltage although the predetermined threshold voltage corresponds to the level of the actual cell capacity, capable of operating the supplementary functions, the notification to the effect of restricting only the supplementary functions can be given to the user, so that the same effect as that for the invention as set out in claim 10 can be gained. Incidentally, the cellular telephone according to the invention refers to a terminal of mobile communication system, including a PHS.

[0022]

Further, respective reference numerals inside the parentheses, assigned to the various means described above, are examples showing relationships with corresponding specific means as described with reference to an embodiment of the invention, described later on.

[0023]

[Preferred Embodiment of the Invention]

An embodiment of a cellular telephone according to the invention is shown in Fig. 1. Fig. 1 is a front view of the cellular telephone, and in Fig. 1, the cellular telephone comprises a case 10, a keyboard 20, and a display 30. The keyboard 20 is disposed in a front-face case part 11 of the case 10, and the keyboard 20 comprises a cross key 21, a power key 22, a function key (F) 23, ten-keys

(character · numerical keys) 24a to 24k, 24m, and other keys 25a to 25d. The display (liquid crystal panel) 30 is disposed inside an opening 12 provided in the front-face case part 11 of the case 10 to display various kinds of information.

[0024]

Next, referring to Fig, 2, an electrical circuit configuration of the cellular telephone is described hereinafter. Fig, 2 is a block diagram showing a schematic configuration of the cellular telephone. As shown in Fig, 2, the cellular telephone is provided with a microphone 40a, a receiver 40b, earphones 40c, an earphone-microphone terminal 40d, a speech processor 50, a wireless part 60, an antenna 65, a secondary cell 70, a memory 80, and a controller 90.

[0025]

The microphone (speech transmission part) 40a converts speech of a user into transmission speech signals, which are sent out to the speech processor 50. The receiver (speech receiving part) 40b outputs received speech from a caller or music sound on the basis of receive-speech signals, or music signals from the speech processor 50.

[0026]

The speech processor 50 under control by the controller 90 converts demodulation signals from the wireless part 60 into the receive-speech signals to be sent out from the earphones 40c (through the earphone-microphone terminal 40d) or the receiver 40b while the speech processor 50 converts the transmission speech signals from the microphone 40a into transmission signals to be sent out to the wireless part 60. Further, the speech processor 50, under control by the controller 90, sends out the music signals to the earphones 40c or the receiver 40b.

[0027]

The wireless part 60 converts receive-signals received via the antenna 65 into the demodulation signals to be sent out to the speech processor 50 while modulating the transmission signals from the speech processor 50, thereby transmitting modulation signals via the antenna 65. The secondary cell 70 supplies power to the speech processor 50, wireless part 60, memory 80, and controller 90, respectively. The memory 80 holds music data, together with a computer program. However, the music data is delivered via Internet to be thereby held in the memory 80. Further, the memory 80 is provided with an operation flag (MF) indicating a music function in operation state, and a

music function enabling flag (MQ) indicating authorization on operation of the music function.

[0028]

The controller 90 is made up of a microcomputer, and so forth, and executes music function processing, cell voltage monitor processing, and so forth. The controller 90 executes the cell voltage monitor processing in accordance with flow charts shown in Figs. 4 and 5, respectively. Steps 100 to 160, shown in Fig. 5, however, are the same as Steps 100 to 160, shown in Fig. 7. Before describing the cell voltage monitor processing by the controller 90, the music function processing by the controller 90 will be described hereinafter with reference to Fig. 3. The music function enabling flag (MQ) and the operation flag (MF) are initialized by turning power ON to be thereby reset. The controller 90 executes the music function processing in accordance with a flow chart shown in Fig. 3. Upon input of function No. "F18" in response to pushing down at the keyboard 20 during queuing, the music function processing is started. First, determination on whether or not the music function enabling flag (MQ) is reset is made (Step 200), and if the music function enabling flag (MQ) is reset ( $MQ = 0$ ), it is determined that the start of the music function has been authorized.



[0029]

Next, the operation flag (MF) is set (Step 210), the music data held in the memory 80 is read (Step 220), and based on the music data as read, music signals are sent out to the speech processor 50 (Step 230), whereupon the speech processor 50 is driven according to the music signals, thereby enabling music sound to be sent out from the earphones 40c (or the receiver 40b).

[0030]

Next, when the music function enabling flag (MQ) is set in Step 200, it is determined that the start of the music function is unauthorized, and the music function processing proceeds to Step 240, thereby causing the display 30 to display a warning to the effect of "restriction on the music function". Thus, if the music function enabling flag (MQ) is set, the display 30 is to display the warning to the effect of "restriction on the music function" every time the function No. "F18" is inputted. Thereafter, the display 30 is caused to display to the effect that selection on whether or not the music function is to be restricted should be made, namely, "(1) the music function OFF, or (2) the music function ON" (Step 250).

[0031]

If one of the ten-keys, 24b "2", is pushed down at this point in time, the music function processing proceeds to Step 210. Thus, even if a monitor voltage is a threshold voltage  $V_{01}$  or lower, the music function can be actuated so as to suit preferences of the user. When one of the ten-keys, 24a "1", is pushed down in Step 250, it is determined that the music function is to be restricted.

[0032]

The cell voltage monitor processing by the controller 90 is described hereinafter with reference to Figs. 4 and 5. First, a voltage at a positive pole terminal of the secondary cell 70 is monitored, thereby determining whether or not a monitor voltage is a threshold voltage  $V_{01}$  or lower (Step 300) provided, however, that the threshold voltage  $V_{01}$  is set to a level of the voltage at the positive pole terminal of the secondary cell 70, capable of operating the music function, smaller in value than the threshold voltage  $V_{00}$ , and larger in value than  $V_{11}$  ( $V_{00} > V_{01} > V_{11}$ ).

[0033]

Next, if the monitor voltage is the threshold voltage  $V_{01}$  or lower, the processing proceeds to Step 310, thereby determining whether or not the music function (supplementary function) is in operation according to the

operation flag (MF). If the operation flag (MF) is set at this point in time, it is determined that the music function is in operation, whereupon the speech processor 50 executes processing for output of warning sound for restriction on the music function (Step 320). Consequently, the speech processor 50 causes the warning sound for restriction on the music function to be superimposed on music to be sent out from the earphones 40c. For example, the speech processor 50 causes the warning sound for restriction on the music function, for example, the warning sound such as "bleep, bleep, bleep" to be superimposed on music to be sent out from the earphones 40c.

[0034]

Next, the music function enabling flag (MQ) is set (Step 330), thereby stopping output of the music signals to the earphones 40c by the speech processor 50. Hereupon, the voltage at the positive pole terminal of the secondary cell 70 is monitored, thereby determining whether or not the monitor voltage is the threshold voltage  $V_{00}$  ( $> V_{11}$ ) or higher (Step 340), and if the monitor voltage is the threshold voltage  $V_{00}$  or higher, the music function enabling flag (MQ) is reset as processing for derestriction of the music function (Step 350). Thus, as described above, when the function No. "F18" is inputted, the music function

can be actuated.

[0035]

If the operation flag (MF) is reset in Step 310, the processing proceeds to Step 380, thereby setting the music function enabling flag (MQ). Consequently, even if the function No. "F18" is inputted, actuation of the music function can be inhibited.

[0036]

Next, the voltage at the positive pole terminal of the secondary cell 70 is monitored, thereby determining whether or not the monitor voltage is the threshold voltage  $V00$  ( $> V11$ ) or higher (Step 390), and if the monitor voltage is the threshold voltage  $V00$  or higher, the processing proceeds to Step 350. If the monitor voltage is lower than the threshold voltage  $V00$ , the processing proceeds to Step 100. Thereafter, as described in the foregoing, the same processing as that in Step 120 through Step 150 is executed after the same processing as that in Step 110, or Step 160.

[0037]

Now, the features of the embodiment of the invention are described hereinafter. That is, although the threshold voltage  $V01$  higher than both the threshold voltage  $V12$ , and  $V11$  is adopted, and the threshold voltage  $V01$  is set to the

level of the voltage at the positive pole terminal of the secondary cell 70, capable of operating the music function, the music function is restricted if the voltage (the monitor voltage) at the positive pole terminal of the secondary cell 70 becomes lower in comparison with the threshold voltage V01, so that a drop in the actual cell capacity that remains can be deterred, thereby prolonging operable time of the telephone function (refer to Fig. 6).

[0038]

In addition, the warning to the effect of "restriction on the music function" is issued in sound or display. That is, because the user can be notified of the warning for the drop in the actual capacity of the secondary cell 70, it is possible to urge the user to restrict use of the music function. Thus, the drop in the actual cell capacity of the secondary cell 70 can be effectively deterred.

[0039]

With the present embodiment described as above, there has been described the case where the voltage at the positive pole terminal of the secondary cell 70 is adopted as means for detecting the actual cell capacity, however, something other than the voltage at the positive pole terminal may be adopted instead.

[0040]

Further, with the present embodiment described as above, there has been described the case where the warning sound for restriction on the music function is superimposed on music to be sent out from the earphones 40c, however, the invention is not limited thereto, and the warning sound may be sent out from the receiver 40b, or a receive melody speaker.

[0041]

Still further, in carrying out the invention, the threshold voltage V01 for determining whether the processing for the restriction on the music function (supplementary function) is to be executed or not may be selected (changed) in response to operation at the keyboard 20.

[0042]

Yet further, in carrying out the invention, means for executing the functions may be implemented by means of a hardware configuration.

[0043]

Further, with the present embodiment described as above, there has been described the case where the power source is turned OFF as processing for restricting the telephone function (Step 150), however, the invention is

not limited thereto, and after the power source is turned OFF, the OFF state of the power source may be cancelled in response to operation at the keyboard 20, thereby enabling the telephone function to be used as long as the actual cell capacity permits.

[0044]

Further, in carrying out the invention, the supplementary functions are not limited to the music function, and may include any function other than the telephone function. For example, the invention may be applied to a cellular telephone with a television attached, and a television function as one of the supplementary functions may be restricted. In this connection, the telephone function refers to a function for communication of speech, and a function for communication of data, and the function for communication of speech is not limited to communication with the side of communication networks, including communication with communication terminals. Similarly, the function for communication of data is not limited to communication with the side of the communication networks, and includes communication with the communication terminals. However, the function for communication of data may be rendered selectable as one of the supplementary functions.

[Brief Description of the Drawings]

[Fig. 1]

Fig. 1 is a front view of an embodiment of a cellular telephone according to the invention.

[Fig. 2]

Fig. 2 is a block diagram showing an electrical circuit configuration of the cellular telephone.

[Fig. 3]

Fig. 3 is a flow chart showing a music function processing by a controller 90 shown in Fig, 2.

[Fig. 4]

Figs. 4 is a flow chart showing a part of a cell voltage monitor processing by the controller.

[Fig. 5]

Figs. 5 is a flow chart showing the rest of the cell voltage monitor processing by the controller.

[Fig. 6]

Fig. 6 is a schematic view illustrating the effect of the embodiment as described above.

[Fig. 7]

Fig, 7 is a flow chart showing operation of a controller of a conventional cellular telephone.

[Description of Reference Numerals]

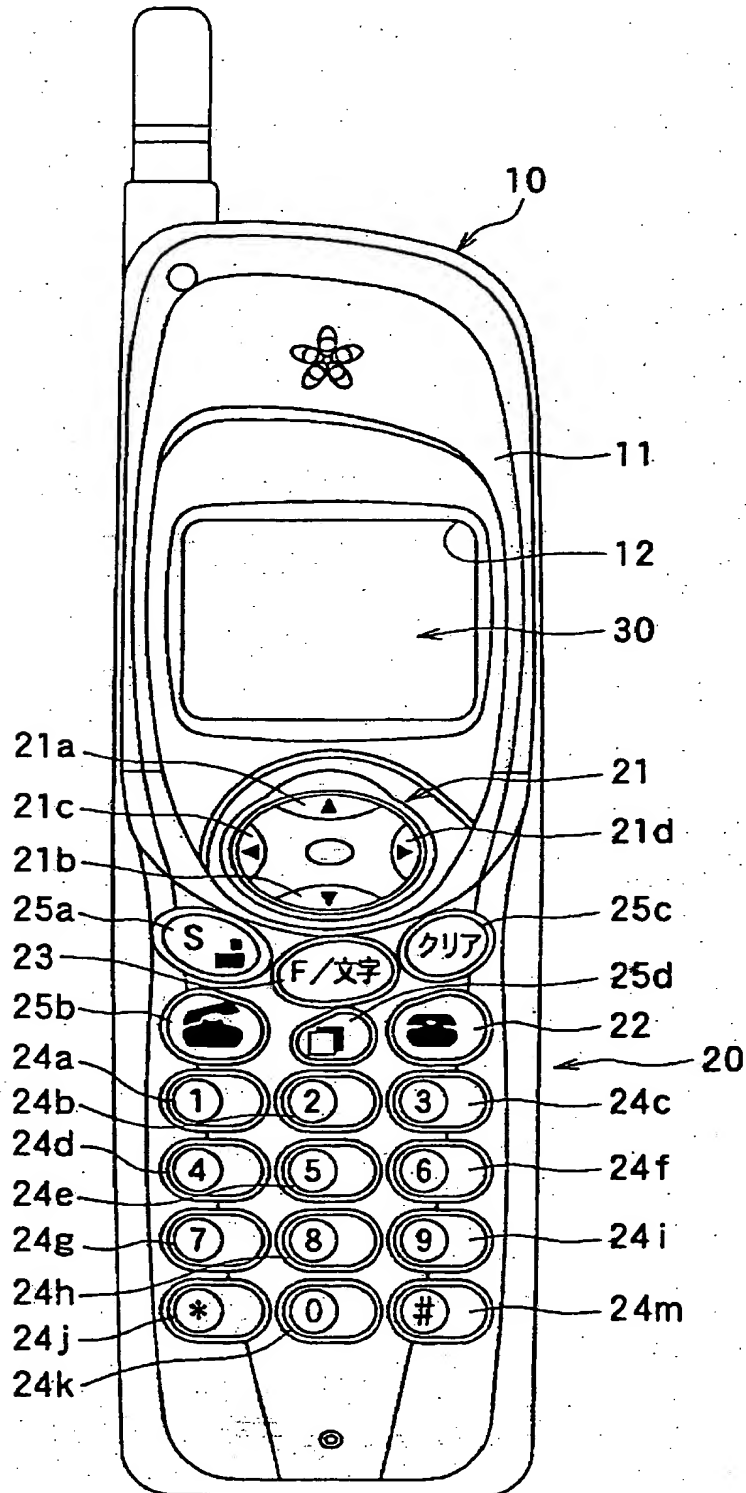
40c: earphones, 50: speech processor,



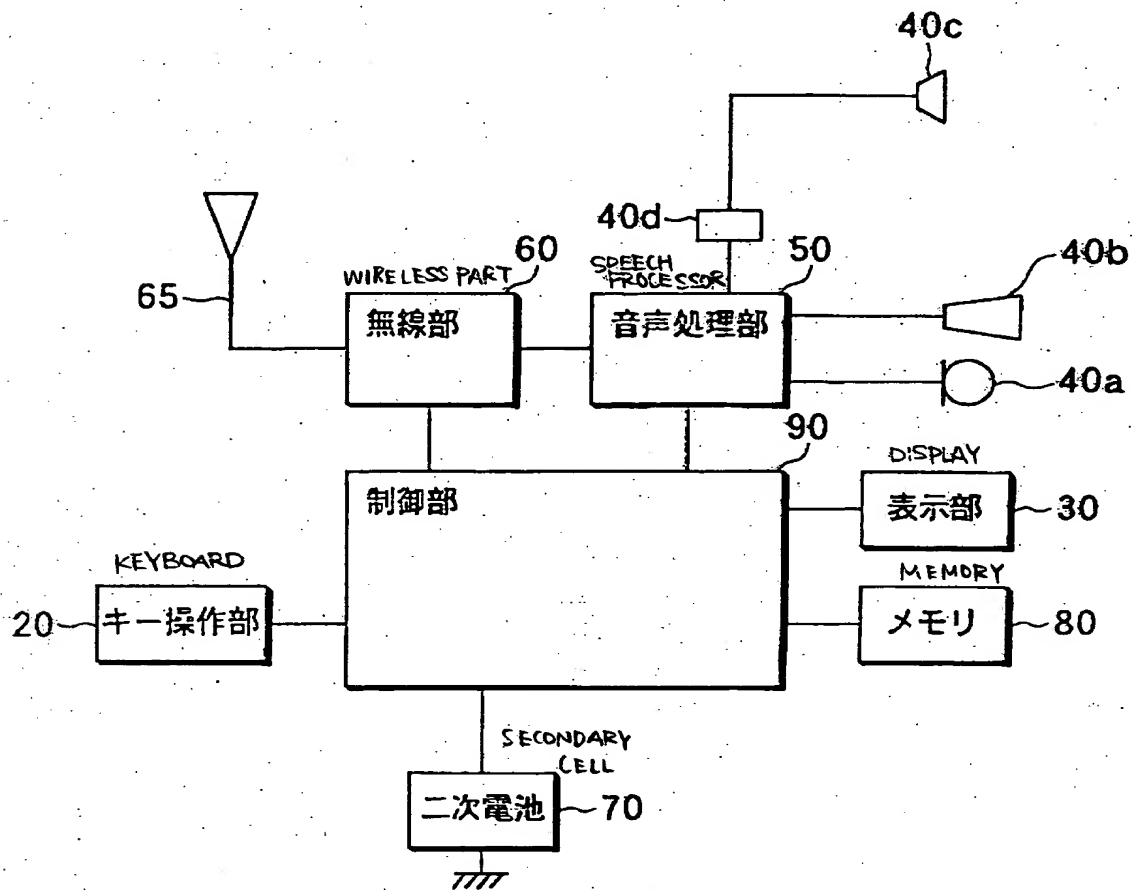
70: secondary cell, 90: control circuit

【書類名】 図面  
NAME OF DOCUMENT DRAWINGS

【図 1】  
FIG. 1

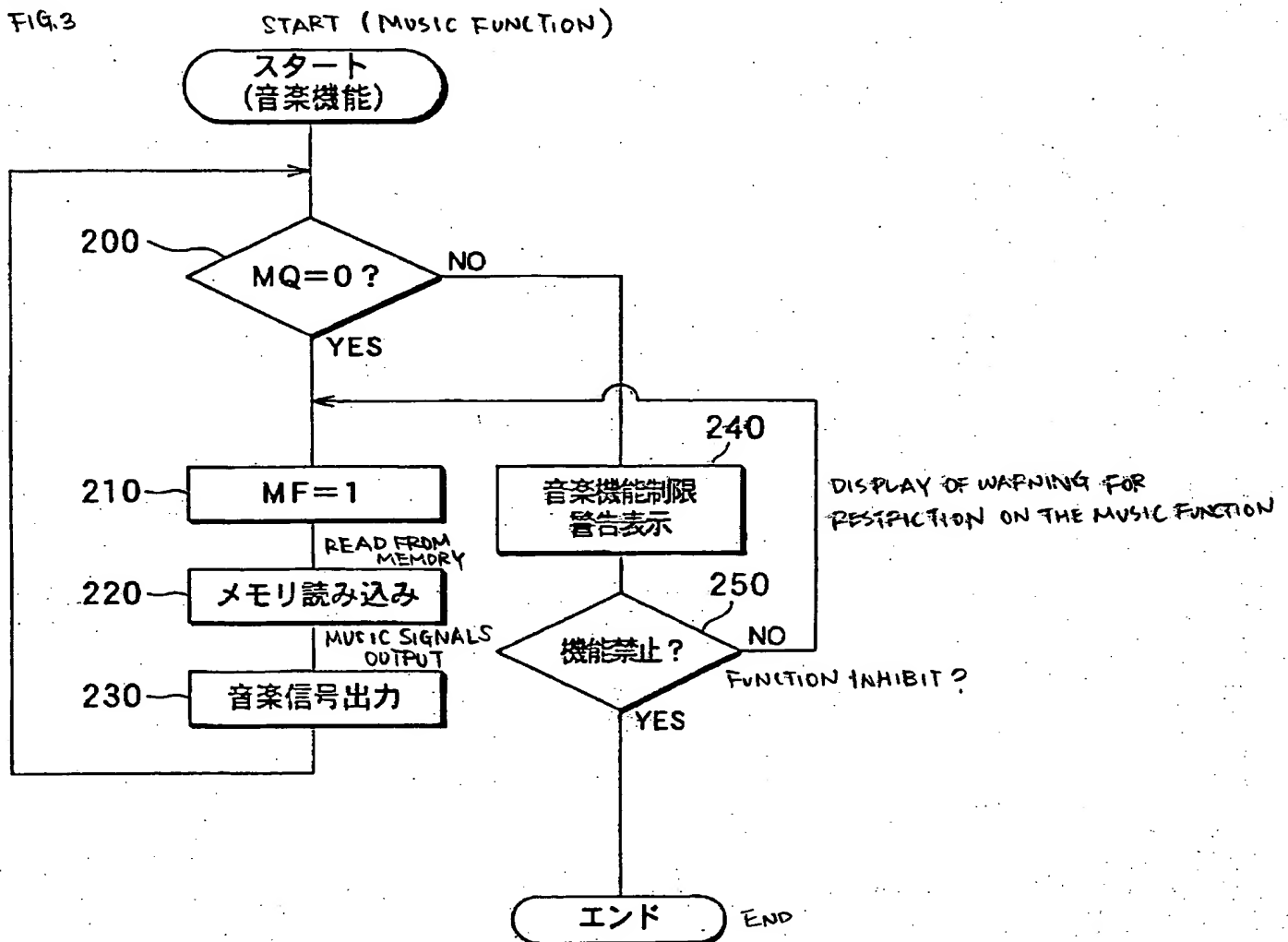


【図 2】  
FIG. 2

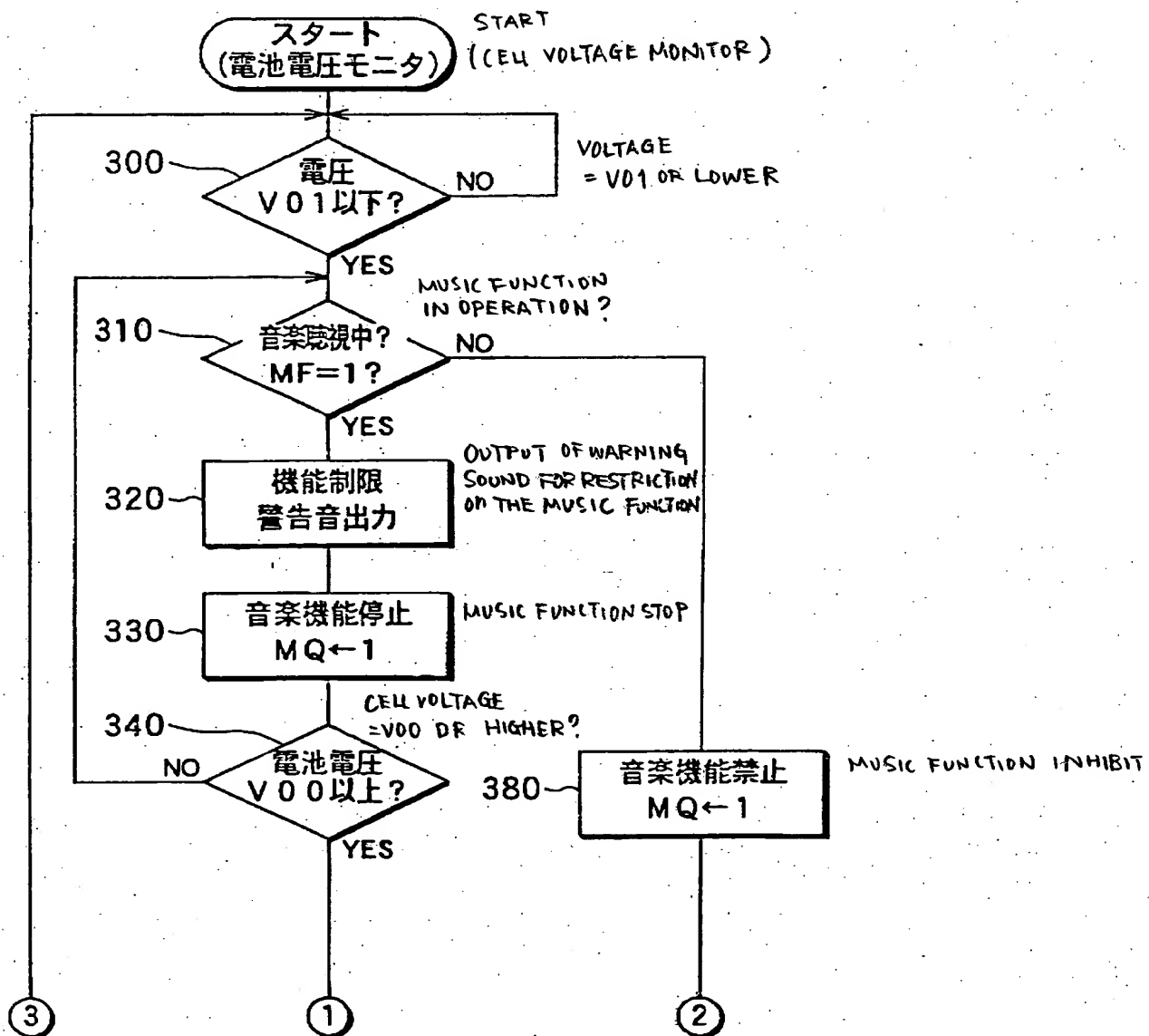


【図 3】

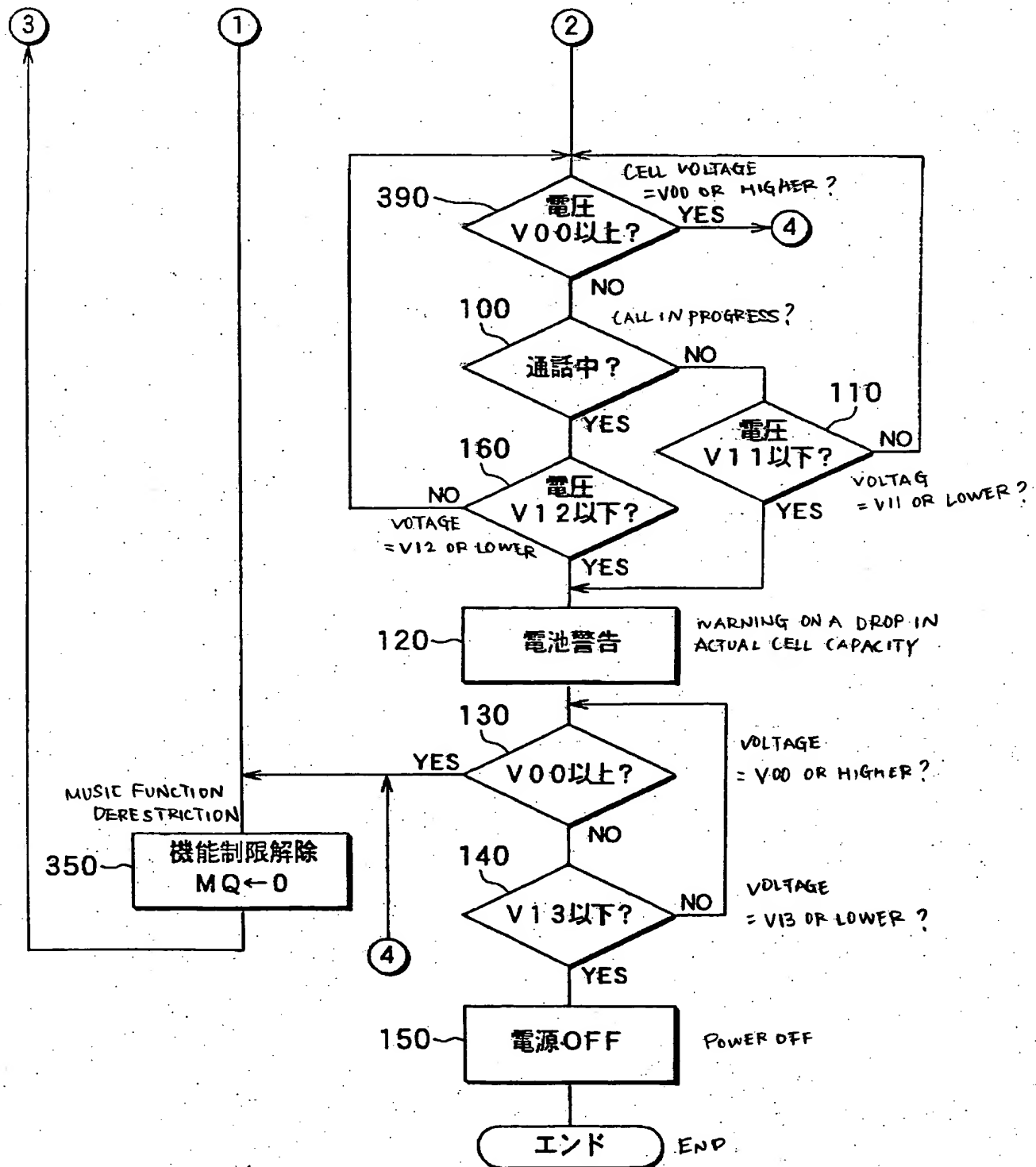
FIG. 3



【図 4】  
FIG. 4

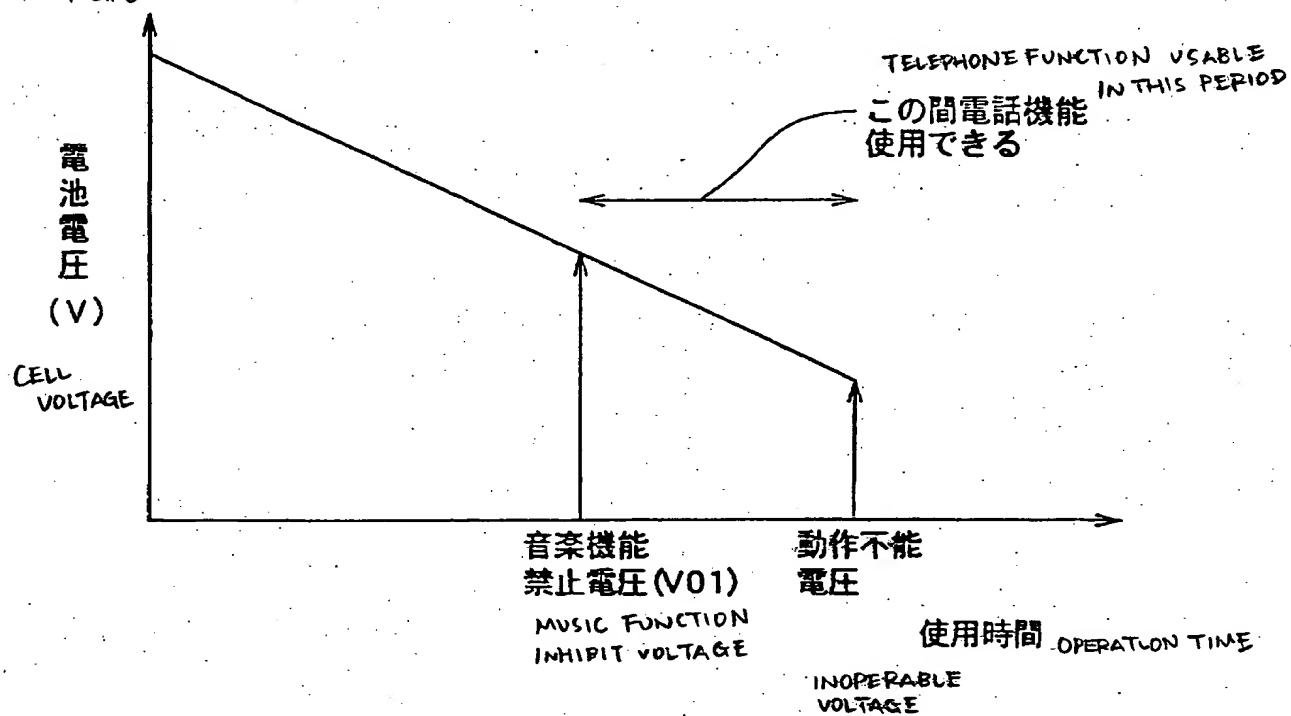


【図 5】  
Fig. 5



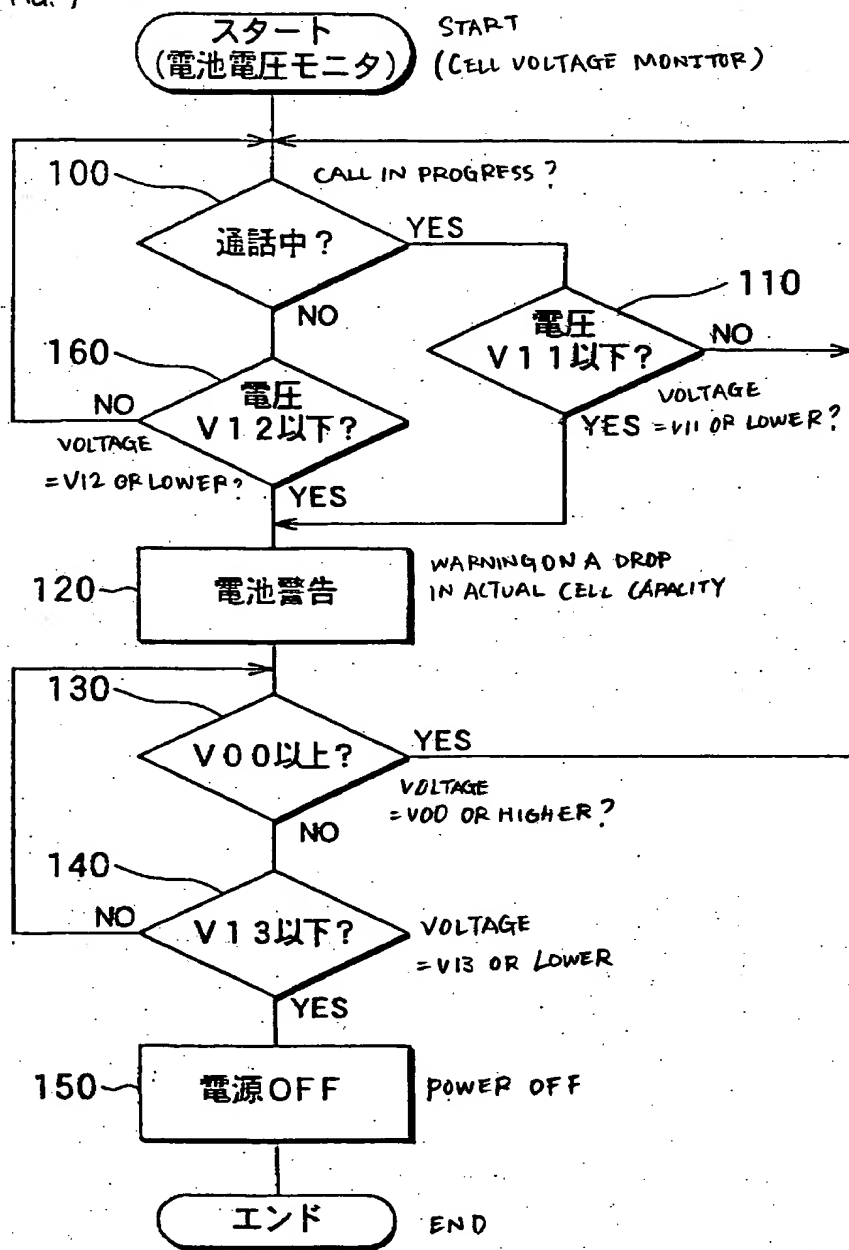
【図 6】

FIG. 6



【図 7】

FIG. 7





[Title of Document] Abstract

[Abstract]

[Problem]

To prolong operable time of the telephone function of a cellular telephone

[Solution]

A voltage at the positive pole terminal of a secondary cell 70 is monitored, thereby determining whether or not a monitor voltage is a threshold voltage V01 or lower (Step 300), and if the monitor voltage is the threshold voltage V01 or lower, a processing proceeds to Step 310, thereby determining whether or not a music function is in operation. If the music function is in operation, a speech processor 50 executes processing for output of warning sound for restriction on the music function, superimposed on music (Step 320). As a result, the warning sound for restriction on the music function, superimposed on music, is sent out from earphones 40c. Subsequently, outputting of the music signals to the earphones 40c by the speech processor 50 is stopped.

[Selected Drawing] Fig, 3